

## **AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

- 1           1. (Currently amended) A method for detecting a thermal anomaly in a  
2 computer system, comprising:  
3           determining correlations between instrumentation signals in the computer  
4 system;  
5           deriving an estimated signal for a thermal sensor in the computer system  
6 from the correlations, wherein the estimated signal is derived from correlations  
7 with other instrumentation signals in the computer system;  
8           comparing an actual signal from the thermal sensor with the estimated  
9 signal to determine whether a thermal anomaly exists in the computer system; and  
10          if a thermal anomaly exists, generating an alarm.
  
- 1           2. (Original) The method of claim 1, wherein generating the alarm  
2 involves communicating the alarm to a system administrator so that the system  
3 administrator can take remedial action.
  
- 1           3. (Original) The method of claim 2, wherein communicating the alarm to  
2 the system administrator involves communicating information specifying the  
3 nature of the thermal anomaly to the system administrator.

1           4. (Original) The method of claim 1, wherein comparing the actual signal  
2 with the estimated signal involves using sequential detection methods to detect  
3 changes in the relationship between the actual signal and the estimated signal.

1           5. (Original) The method of claim 4, wherein the sequential detection  
2 methods include the Sequential Probability Ratio Test (SPRT).

1           6 (Canceled).

1 |           7. (Currently amended) The method of ~~claim 6~~claim 1, wherein  
2 determining the correlations involves using a non-linear, non-parametric  
3 regression technique to determine the correlations.

1           8. (Original) The method of claim 7, wherein the non-linear, non-  
2 parametric regression technique can include a multivariate state estimation  
3 technique.

1           9. (Original) The method of claim 1, wherein the instrumentation signals  
2 can include:  
3           signals associated with internal performance parameters maintained by  
4 software within the computer system;  
5           signals associated with physical performance parameters measured  
6 through sensors within the computer system; and  
7           signals associated with canary performance parameters for synthetic user  
8 transactions, which are periodically generated for the purpose of measuring  
9 quality of service from and end user's perspective.

1           10. (Original) The method of claim 1,

2            wherein deriving the estimated signal for the thermal sensor involves  
3 deriving multiple estimated signals for multiple thermal sensors in the computer  
4 system; and  
5            wherein comparing the actual signal with the estimated signal involves  
6 comparing multiple actual signals with the multiple estimated signals to determine  
7 whether a thermal anomaly exists in the computer system.

1            11. (Currently amended) A computer-readable storage medium storing  
2 instructions that when executed by a computer cause the computer to perform a  
3 method for detecting a thermal anomaly in a computer system, the method  
4 comprising:  
5            determining correlations between instrumentation signals in the computer  
6 system;  
7            deriving an estimated signal for a thermal sensor in the computer system  
8 from the correlations, ~~wherein the estimated signal is derived from correlations~~  
9 ~~with other instrumentation signals in the computer system;~~  
10           comparing an actual signal from the thermal sensor with the estimated  
11 signal to determine whether a thermal anomaly exists in the computer system; and  
12           if a thermal anomaly exists, generating an alarm.

1            12. (Original) The computer-readable storage medium of claim 11,  
2 wherein generating the alarm involves communicating the alarm to a system  
3 administrator so that the system administrator can take remedial action.

1            13. (Original) The computer-readable storage medium of claim 12,  
2 wherein communicating the alarm to the system administrator involves  
3 communicating information specifying the nature of the thermal anomaly to the  
4 system administrator.

1           14. (Original) The computer-readable storage medium of claim 11,  
2    wherein comparing the actual signal with the estimated signal involves using  
3    sequential detection methods to detect changes in the relationship between the  
4    actual signal and the estimated signal.

1           15. (Original) The computer-readable storage medium of claim 14,  
2    wherein the sequential detection methods include the Sequential Probability Ratio  
3    Test (SPRT).

1           16 (Canceled).

1           17. (Currently amended) The computer-readable storage medium of ~~claim~~  
2    ~~16~~claim 11, wherein determining the correlations involves using a non-linear,  
3    non-parametric regression technique to determine the correlations.

1           18. (Original) The computer-readable storage medium of claim 17,  
2    wherein the non-linear, non-parametric regression technique can include a  
3    multivariate state estimation technique.

1           19. (Original) The computer-readable storage medium of claim 11,  
2    wherein the instrumentation signals can include:  
3           signals associated with internal performance parameters maintained by  
4    software within the computer system;  
5           signals associated with physical performance parameters measured  
6    through sensors within the computer system; and  
7           signals associated with canary performance parameters for synthetic user  
8    transactions, which are periodically generated for the purpose of measuring  
9    quality of service from and end user's perspective.

1           20. (Original) The computer-readable storage medium of claim 11,  
2           wherein deriving the estimated signal for the thermal sensor involves  
3           deriving multiple estimated signals for multiple thermal sensors in the computer  
4           system; and  
5           wherein comparing the actual signal with the estimated signal involves  
6           comparing multiple actual signals with the multiple estimated signals to determine  
7           whether a thermal anomaly exists in the computer system.

1           21. (Currently amended) An apparatus that detects a thermal anomaly in a  
2           computer system, comprising:  
3           a correlation determination mechanism configured to determine  
4           correlations between instrumentation signals in the computer system;  
5           an estimation mechanism configured to derive an estimated signal for a  
6           thermal sensor in the computer system from the correlations, ~~wherein the~~  
7           ~~estimated signal is derived from correlations with other instrumentation signals in~~  
8           ~~the computer system;~~  
9           a comparison mechanism configured to compare an actual signal from the  
10          thermal sensor with the estimated signal to determine whether a thermal anomaly  
11          exists in the computer system; and  
12          an alarm generation mechanism, wherein if a thermal anomaly exists, the  
13          alarm generation mechanism is configured to generate an alarm.

1           22. (Original) The apparatus of claim 21, wherein the alarm generation  
2           mechanism is configured to communicate the alarm to a system administrator so  
3           that the system administrator can take remedial action.

1           23. (Original) The apparatus of claim 22, wherein the alarm generation  
2 mechanism is configured to communicate information specifying the nature of the  
3 thermal anomaly to the system administrator.

1           24. (Original) The apparatus of claim 21, wherein the comparison  
2 mechanism is configured to use sequential detection methods to detect changes in  
3 the relationship between the actual signal and the estimated signal.

1           25. (Original) The apparatus of claim 24, wherein the sequential detection  
2 methods include the Sequential Probability Ratio Test (SPRT).

1           26 (Canceled).

1 |           27. (Currently amended) The apparatus of ~~claim 26~~claim 21, wherein the  
2 correlation determination mechanism is configured to use a non-linear, non-  
3 parametric regression technique to determine the correlations.

1           28. (Original) The apparatus of claim 27, wherein the non-linear, non-  
2 parametric regression technique can include a multivariate state estimation  
3 technique.

1           29. (Original) The apparatus of claim 21, wherein the instrumentation  
2 signals can include:  
3           signals associated with internal performance parameters maintained by  
4 software within the computer system;  
5           signals associated with physical performance parameters measured  
6 through sensors within the computer system; and

7 signals associated with canary performance parameters for synthetic user  
8 transactions, which are periodically generated for the purpose of measuring  
9 quality of service from and end user's perspective.

1 30. (Original) The apparatus of claim 21,  
2 wherein the estimation mechanism is configured to derive estimated  
3 signals for multiple thermal sensors in the computer system; and  
4 wherein the comparison mechanism is configured to compare multiple  
5 actual signals with the multiple estimated signals to determine whether a thermal  
6 anomaly exists in the computer system.